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ON SOME FOSSIL CEPHALOPODA IN THE MUSEUM
OF THE GEOLOGICAL SURVEY OF CANADA,
WITH DESCRIPTIONS OF EIGHT SPECIES
THAT APPEAR TO BE NEW.

By J. F. WHITEAVES.

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*A.—From the Cambro-Silurian rocks of the Provinces
of Quebec, Ontario and Manitoba.*

NANNO AULEMA, Clarke.

Nanno aulema, Clarke. 1897. Geol. Minn., Final Rep., Vol. III,
pt. 2, p. 770, pl. 47, figs. 4-11.

Several specimens in the Museum of the Survey, that are obviously referable to this species, were collected by the late Alexander Murray in 1854, from the Black River limestone at Western Manitou Island (now called Macdonald Island), Lake Nipissing, and similar but silicified specimens have been noticed in an old collection of the fossils of that formation from Paquette's Rapids.

ORTHOCERAS TENUISTRIATUM, Hall.

Endoceras proteiforme, var. *tenuistriatum*, Hall. 1847. Pal. N. York, vol. I, p. 209, pl. 45, figs. 1, *a-b*; and pl. 47, figs. 1, *a-b*, and 2, *a-e*.

Orthoceras tenuistriatum, Clarke. 1897. Geol. Minn., Final Rep., vol. III, pt. 2, p. 788, pl. 55, figs. 5 and 6.

An unusually well preserved specimen of this species, collected by Mr. G. Sutherland in the winter of 1872-73, from the Trenton limestone exposed in excavations for the foundation of the Post Office at Ottawa, was presented to the Museum of the Survey by Mr. W. R. Billings in 1879. The maximum length

*Communicated by permission of the Director. It is intended to publish illustrations of the new species described in this paper, in one of the Survey publications.

of this beautiful fossil is eighty-eight millimetres, or nearly three inches and a half. Its maximum diameter is twenty-six mm. at the larger end and about twenty mm. at the smaller. Its surface markings consist of numerous and densely crowded, but not very regularly arranged, transverse striae, or minute impressed lines, which are crossed by still more minute longitudinal raised ridges, that are not visible without the aid of a lens. The minuteness of this reticulation gives quite a silky sheen to the exterior of the specimen. Its siphuncle is apparently central, or very nearly central.

A large example of *O. tenuistriatum*, with the test preserved, in the same Museum, from the Trenton limestone at Hull, P.Q., was purchased from a quarryman by Dr. Ami and the writer in May, 1889. It is fully seven inches and a half in length, by about fifteen mm. in diameter at the smaller end, and thirty eight at the larger. Its surface also is very minutely reticulated and has a peculiar silky appearance.

A fragment not quite two inches in length and about three quarters of an inch in its maximum breadth, collected by Mr. T. C. Weston in 1866 from the Trenton limestone at the Mile End, Montreal, is also probably referable to this species. The surface of this specimen, which although well preserved is not silky in texture, is finely reticulated by densely crowded and very minute transverse striae, crossed by equally minute and close set longitudinal raised lines and by rather larger and comparatively distant longitudinal ridges, which are from half a millimetre to one mm. and a half apart. It is only these latter that are sufficiently large to be visible to the naked eye.

ORTHOCERAS WESTONI. (Sp. nov.)

Shell medium sized, longicone, straight, increasing very gradually in thickness and slightly but perhaps abnormally compressed. Surface marked by very oblique and rather distant flattened annulations, about a millimetre broad and separated by flat spaces from four to five mm. wide. Internal structure not very well shown in the only specimen collected, but the siphuncle, as

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exposed in a transverse fracture, is eccentric and so large that it may be moniliform.

Trenton limestone, Mile End, Montreal, T. C. Weston, 1866; one specimen about four inches and a half in length.

The writer has much pleasure in associating this singular species, which seems to be well characterized by its distant and very oblique flattened annulations, with the name of its discoverer.

ORTHOCERAS BEAUPORTENSE. (Sp. nov.)

Shell rather below the medium size, longicone, straight and tapering so gradually that the few specimens which the writer has seen are almost cylindrical. Surface marked by low, rounded, narrow transverse annulations, with numerous minute and close set, transverse thread-like raised lines between and upon them, all of which are crossed by small and narrow but comparatively distant longitudinal ribs or ridges. The transverse annulations average from two and a half to three millimetres apart, at their summits, and are separated by shallow depressions nearly twice as wide as themselves. The longitudinal ribs or ridges are equidistant, uniform in size, and, on an average, about one millimetre and a half apart. The crossing of these ribs by the transverse annulations makes a very regular and rectangular reticulation, which is plainly visible to the naked eye, but the crowded transverse raised lines cannot be well seen without the aid of a lens. Internal structure and shape and relative position of the siphuncle unknown.

Trenton limestone at Parent's quarry, Beauport, near Quebec City, D. N. St. Cyr, 1888: one well preserved testiferous specimen not quite two inches in length and with a considerable portion of its surface buried in the matrix. A similar specimen, but with the whole of the outer surface visible, from the same locality, has been lent to the writer by the authorities of Laval University.

This finely sculptured shell seems to be closely allied to the *O. pseudocalamiteum* (Quenstedt) Barrande,* but to want the

*Système Silurien de la Bohême, Vol. II, Texte 3, 1874, p. 261, pl. 217, fig. 8; pl. 222, figs. 11, 12; pl. 228; pl. 236, figs. 11-16; and pl. 361, figs. 15-17.

intermediate longitudinal ridges characteristic of that species. Both clearly belong to Barrande's "Group 6" of the genus *Orthoceras* and to Hyatt's genus *Dawsonoceras*.* The surface ornamentation of *O. Beauportense* appears to be decidedly different from that of any of the small annulated species of *Orthoceras* from the Trenton limestone of the State of New York described and figured by Hall in the first volume of the Palæontology of that State. *O. bilineatum*, Hall, is a much larger and more robust species, with coarser annulations and two series of longitudinal ridges or linear elevations. In *O. clathratum*, Hall, the longitudinal markings are very minute and crowded, and are said to consist of "sharp elevated lines distant $\frac{1}{48}$ of an inch," or very little more than a half a millimetre apart. There are, also, no comparatively coarse and distant longitudinal ribs or ridges in *O. textile*, Hall, and in that species the transverse annulations are represented as both prominent and angular.

TRIPTEROCERAS LAMBII.

Gonioceras Lambi, Whiteaves. 1891. Trans. Royal Soc. Canada, Vol. IX, sect. 4, p. 86, pl. XI, figs. 1, and 1 a-b.

Triptoceras Lambi, Clarke 1897. Geol. Minnesota, Final Rep., Vol. III, pt. 2, p. 793, pl. 56, figs. 1 and 2.

Tripteroceras Lambii, Whiteaves. 1897. Geol. Surv. Canada, Palæoz. Fossils, vol. III, pt. 3, p. 213.

The type of this species is a well preserved specimen of the septate portion of the shell, rather more than ten inches in length but imperfect at both ends, collected in the Galena—Trenton limestone at East Selkirk, Manitoba, by Mr. ~~J. B. Tyrrell~~ ^{E. M. Lamb} in 1890. Until quite recently, the only other specimen that the writer had seen is the badly preserved but otherwise similar case collected at Wekusko Lake, in the District of Saskatchewan, by Mr. Tyrrell in 1897 and referred to on page 214 of the third volume of "Palæozoic Fossils" published by the Geological Survey of

* It seems to the writer that it would be more euphonious and more in accordance with classical usage to write *Dawsoniceras* and *Barrandiceras* rather than *Dawsonoceras* and *Barrandeoceras*.

Canada. This specimen, which is also imperfect at both ends, is about a foot in length, and seven inches and three quarters in breadth at the larger end.

In the fall of 1897, however, a specimen from East Selkirk, collected by the late Professor J. H. Panton in 1884 and belonging to the Provincial Museum at Winnipeg, which is obviously referable to this species, was lent to the writer by Mr. J. P. Robertson, at the suggestion of Mr. Tyrrell. This fossil is a badly preserved cast of the interior of the shell in a slab of building stone, and only the ventral surface is exposed. It is of interest as being much the largest specimen of the species that has yet been found and as having a considerable portion of the body chamber preserved. As measured along the middle of the exposed surface longitudinally, its length is twenty-three inches, the septate portion being twelve inches in length and the non-septate eleven. Its maximum diameter or breadth is seven inches and three quarters at the smaller end, and nine inches and a quarter at the larger. About twenty-eight septa can be counted in the septate portion, and they are from a quarter of an inch to a half an inch apart at the surface. The specimen is slightly imperfect at both ends and must have been more than a foot in length when entire.

According to Professor Clarke (op. cit. p. 793) the *Orthoceras ziphias*, *O. hastatum* and *O. servile*, of Billings, are referable to Hyatt's genus *Tripteroceras*. To these may be added, as Canadian representatives, the present species and possibly *O. semiplanatum*, nobis.

CYRTOCERAS QUEBECENSE. (Sp. nov.)

Shell elongate conical, increasing very slowly in thickness and not much curved; dorsum slightly compressed, venter and sides rounded. Siphuncle large, cylindrical, dorsal and marginal; septa apparently rather closely approximated.

Length of the only specimen collected, which is imperfect at both ends, about seventy-five millimetres, or three inches; thickness of the same about eleven mm. at the smaller end, and nearly thirty at the larger.

Levis limestone at Pointe Lévis, opposite Quebec City. T. C. Weston ; a single specimen, which seems to be quite distinct from all the species of *Cyrtoceras* from that locality, described by E. Billings in the first volume of "Palæozoic Fossils."

BARRANDEOCERAS SUBCOSTULATUM. (Nom. prov.)

Shell consisting of about two gyroceran volutions which are coiled loosely on the same plane, but nowhere in close contact, and gradually becoming more eccentric, the outer one slightly compressed both above and below, so that the outline of a transverse section near the aperture would be broadly elliptical, and the dorso-ventral diameter a little greater than the lateral.

Surface of the test distinctly costulate, though in the only specimen that the writer has seen the ribbing is most clearly defined on the inner volution where it consists of rather distant but irregularly disposed, small, thin, acutely angular and slightly flexuous, transverse ribs or ridges, which are generally much narrower than the very shallow depressions between them, and marked with numerous minute striations parallel to the ribs. Sutures of the septa not clearly indicated ; shape and relative position of the siphuncle unknown.

Black River limestone at Wolfe Island, near Kingston ; a fine specimen fully four inches in its maximum diameter, which was presented to the Museum of the Survey by Professor James Fowler in 1888.

According to Hyatt, *B. convolvans* (the *Lituities convolvans* of Hall but apparently not of Hisinger), of the Black River limestone of the State of New York, has a smooth shell, though its shape appears to be essentially similar to that of the specimen from Wolfe Island.

LITOCERAS VERSUTUM, Billings. (Sp.)

Nautilus versutus, Billings. 1865. Geol. Surv. Canada, Palæoz. Fossils, Vol. I, p. 259.

Litoceras versutum, Hyatt. 1883. Genera of Fossil Cephalopods (Proc. Boston Soc. Nat. Hist., Vol. XXII) p. 268.

Litoceras Whiteavsi, Hyatt. 1894. Phylogeny of an Acquired Characteristic (Proc. Amer. Philos. Soc., Vol. XXXII) p. 475.

On page 475 of the paper last cited Professor Hyatt writes as follows, in reference to his genus *Litoceras*. "The type of this genus, when it was first described, were the specimens in the Geological Museum at Ottawa identified as *Nautilus versutus* of Billings, but these appear here as *Litoceras Whiteavsi*, since there is every reason for supposing that they are not the species described by Billings under the name of *versutus*." A few lines farther on, Professor Hyatt makes the following remarks upon his *Litoceras Whiteavsi*. "Having examined the so-called originals of this species" (i.e., of *Nautilus versutus*, Billings) "so far as they exist in the Geological Museum at Ottawa, I have found that none of them came from Billings' locality, Bonne Bay, and none of them agree with Billings' description. Billings' species had ten septa to the inch; this species has the sutures about one-quarter of an inch apart, a difference shewing essential distinction." These statements are unfortunately based upon such grave misapprehensions of the facts of the case as to call imperatively for some explanation. When Professor Hyatt visited the Museum of the Survey there were, and are still, five specimens of nautiloid shells from the "Quebec Group" of Newfoundland on exhibition in one of the upright cases. One of these then had, and still has, two labels attached to it, one printed and the other written. The printed label reads,—"*Newfoundland, Bonne Bay, East Arm, S.-W. side. 1861. J. R.*"—and the written one,—"*N. versutus, type.*" Moreover, notwithstanding Prof. Hyatt's statement to the contrary, this specimen does agree with Billings' description and measurements of the type and only known specimen of *Nautilus versutus*, and it clearly has about ten septa to the inch. Of the other specimens, three are labelled as having been collected at Point Rich by Mr. James Richardson in 1861. These, in the writer's judgment, are most probably the types of *Nautilus insolens*, Billings, and apparently also of *Lito-*

ceras biangulatum, Hyatt. The fifth specimen, which was collected at Table Head by Mr. Richardson in 1861, is a small specimen of *Lituities Pluto*, Billings, but clearly not the type of that species.

*B.—From the Silurian (Upper Silurian) rocks of
Manitoba.*

TRIPLEUROCERAS ROBSONI. (Sp. nov.)

Shell large, robust, longicone, straight and increasing very slowly in breadth and thickness, flattened in the broad siphonal and presumably ventral region, but rounded and much narrower at the sides: characters of the antisiphonal side and nature of the surface markings unknown. Sutures of the septa broadly and concavely arched on the venter, nearly straight where they pass over the sides; the three or four next to the body chamber closer together than those which immediately precede them. Siphuncle marginal, presumably ventral, large, expanded between the septa and apparently nummuloidal.

Three imperfect and badly preserved casts of the interior of shells of this species, from Stonewall, Manitoba, were presented to the Museum of the Survey in the fall of 1897, two by Mr. W. H. Robson, of Lethbridge, Alberta, and one by Mr. Donald Gunn of Stonewall. The whole of the antisiphonal and presumably dorsal region of each of these specimens is buried in a very hard dolomitic limestone, so that it is doubtful whether they are referable to Hyatt's genus *Tripleuroceras* or not. The two presented by Mr. Robson are septate throughout, and the larger one has a nearly cylindrical, septate but possibly adventitious object, like a cast of the interior of the shell of a small *Orthoceras*, some two inches in length and fully half an inch in thickness, exposed in the middle of its siphuncle posteriorly. The one presented by Mr. Gunn has a considerable portion of the ventral side of the body chamber preserved, but the lateral margin on both sides is very imperfect.

The species seems to differ from the "*Orthoceras* (*Actino-*

ceras) Beloitense" of Whitfield,* from the Trenton limestone of Wisconsin, which it resembles in some respects, in its more flattened venter, more concavely arched septa in the ventral region, and in its proportionately larger and apparently nummuloidal siphuncle.

TRIOCHOCERAS INSIGNE. (Sp. nov.)

Shell, or rather cast of the interior of the shell, rather large and attaining to a maximum diameter of fully five inches, dextral and consisting of two slender, closely contiguous volutions that are coiled on very nearly the same plane, and slightly compressed both above and below, so that the outline of a transverse section of the outer volution would be broadly elliptical, with the dorso-ventral diameter a little greater than the lateral. Surface of the test unknown, that of the cast marked by large, transverse rib-like plications, which are moderately prominent on each of the sides, but obsolete on the periphery or venter,—and by very small, acute, thread-like spiral ridges. The transverse plications are rather distant, slightly flexuous and somewhat sigmoidal on each side of the outer volution, where they are separated by wide and shallowly concave depressions. The small spiral ridges are numerous, comparatively close together, though not very regularly disposed, and in one specimen, at least, rather larger and more prominent on the periphery of the outer volution than on its sides. Sutures of the septa concavely arched on both of the sides, where each suture intersects one, or rarely two, of the transverse plications. Shape and position of the siphuncle unknown.

The first specimen of this shell that the writer had seen was given to the late Chief Justice Wallbridge by a quarry man at Stonewall and presented to the Museum of the Survey by Prof. E. J. Chapman in 1895. The exact locality from which this specimen was obtained was for a long time doubtful, but there is now every reason for believing that it came from the quarries at Stonewall. At any rate, in the fall of 1897, two specimens

* *Geology of Wisconsin*, Vol. IV, p. 226, pl. 8, fig. 1; and pl. 10, figs. 9, and 10.

which are known to have been collected at Stonewall were presented to the Museum, one by Mr. John Gunn, and the other by Mr. W. H. Robson. At the same time, also, Mr. Tyrrell obtained a characteristic fragment of a specimen of this species, *in situ*, at the Stonewall quarries. By far the most perfect of the specimens yet received is the one presented by Mr. Gunn. It has two entire volutions preserved, which are gyroceran rather than nautilian in their mode of coiling, but very slightly asymmetrical. The inner volution is openly coiled, the apex or initial point being widely eccentric, and there is a large central perforation about an inch and a quarter in diameter.

These specimens seem to indicate a previously undescribed species, which is here referred provisionally to *Trochoceras* rather than to *Lituities*, until the shape and relative position of its siphuncle be ascertained, when it may have to be transferred to *Plectoceras*, *Peismoceras* or *Discoceras*. It differs from *Lituities Bickmoreanus* Whitfield, (from the Niagara limestone of Indiana) which Hyatt says is a *Plectoceras*, in its more openly coiled inner volution, in its broadly elliptical and not subquadrate cross section, and in its closer transverse plications, which are quite obsolete on the periphery. Professor Whitfield, who has kindly compared two of the best specimens from Stonewall with the types of his species, thinks that the two forms are quite distinct.

C.—From the Devonian rocks of Ontario.

ORTHOCERAS WALPOLENSE. (Sp. nov.)

Shell small, longicone, straight, slender and increasing very slowly in thickness, slightly and perhaps abnormally compressed. Test unknown; surface of the cast marked by thin acute, transverse, annular ridges, which are much narrower than the grooves between them. Septa, and shape and position of the siphuncle unknown.

The largest specimen known to the writer was collected many years ago by J. DeCew in the Corniferous limestone of Lot 6, Concession 14, of the Township of Walpole. It is about

eighty-four millimetres ($3\frac{1}{4}$ inches) in length, by six mm. in thickness at the smaller end and about fourteen at the larger. Near the smaller end there are about ten annulations and near the larger end about six, in a length of ten mm. The only other specimen that the writer has seen, is a fragment about an inch and a half in length, from the same formation and labelled Lot 42, Concession 1, Cayuga, which is probably referable to this species. It has about eight annulations in a length of ten mm., at the larger end.

O. Thestor, Hall,* is described as having proportionately finer annulations, and *O. Idmon*, Hall,† judging from the figure, is almost cylindrical.

ORTHOCERAS HAGERSVILLENSE. (Sp. nov.)

Shell of medium size, straight, longicone and increasing slowly in thickness. Surface markings consisting of a fine rectangular reticulation caused by the crossing of numerous equidistant and continuous, minute and close-set, longitudinal ridges, by transverse but otherwise similar ridges. In the only specimen that the writer has seen, the longitudinal ridges are rather less than a millimetre apart at the smaller end, and about a millimetre apart at the larger; while the transverse ridges are slightly closer together, especially towards the larger end. Septa, and shape and position of the siphuncle unknown.

Corniferous limestone at Hagersville, collected by the writer in 1890; a slightly distorted specimen, about three inches long and an inch broad at the larger end, with a considerable portion of its surface buried in the matrix.

The species seems to be well characterized by the minute reticulation of its surface, though its internal characters are unknown.

* Palæontology of the State of New York, Vol. v, pt. 2, p. 302, pl. 82, fig. 18.

† Ibid., p. 302, pl. 43, figs. 11 and 12.

GOMPHOCERAS EXIMIUM, Hall.

Gomphoceras eximium, Hall. 1861. Fourteenth Reg. Rep. N.Y. St. Cab. Nat. Hist., p. 109.

“ “ “ 1876. Illustr. Devon. Fossils : Cephalopoda, pl. 44, figs. 1 and 2.

“ “ “ 1879. Pal. N. York, vol. v, pt. 2, p. 329, pl. 44, figs. 1, 2 : and Supplement (1888) p. 32, pl. 120, figs. 1-3 ; and pl. 121, figs. 1 and 2.

In the Museum of the Survey there are two good specimens of this species, from the Corniferous limestone of St. Marys, one presented by Mr. Blackader, of Montreal, about the year 1879 or 1880, and the other obtained through Mr. David Boyle, of Toronto, in 1884.

GYROCERAS NUMA, Billings.

Gyroceras Numa, Billings. 1874. Canad. Nat. and Geol., N.S., vol. VII, p. 238.

The type and for many years the only known specimen of this rather obscurely defined species, is a very imperfect cast of the interior of the shell, which is said to be “about 10 inches” in its maximum diameter, from the Corniferous limestone at Kilworth, collected by E. or J. DeCew. In 1884 a somewhat more perfect and rather smaller but otherwise essentially similar specimen, from the Corniferous limestone of Pelce Island, was presented to the Museum of the Survey by the Rev. W. Minter Seaborn. This specimen, which is about seven inches in its maximum diameter, shows that the sutures of the septa are flexuous, and sigmoidally curved on each side of the shell. The surface markings, and the shape and relative position of the siphuncle of *G. Numa* are still unknown.

Ottawa, July 28th, 1898.

